

REMARKS

In the Office Action mailed July 17, 2007, claims 1 and 3-20 were rejected. Claims 1, 3-8, 11-13 and 15-18 were rejected under 35 U.S.C. §102(b) as being anticipated by Bauck et al. (U.S. Pat. No. 4,189,759).¹ Claims 9, 10, 14, 19 and 20 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. in view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833).

Claim Rejections - 35 U.S.C. §102(b)

Claims 1, 3-8, 11-13 and 15-18 were rejected under 35 U.S.C. §102(b) as being anticipated by Bauck et al. (U.S. Pat. No. 4,189,759).

Independent claim 1 relates to an endcap for use on an actuator arm carrying a single head gimbal assembly, and requires a body of the endcap connected to the actuator arm and a shielding feature extending from the body in a cantilevered configuration for reducing windage excitation of the head gimbal assembly.

Bauck et al. discloses a cantilevered beam assembly 20 that includes a base portion (or base plate) 22, a U-shaped guard portion 24, and a tip portion (or load beam) 26. (Bauck et al., col. 6, ll. 26-47; FIGS. 2 and 3). The base portion (or base plate) 22 has holes 46, 48 and 50 for screw attachment to a carriage that is not shown in FIGS. 2 and 3. (Bauck et al., col. 6, ln. 63 to col. 7, ln. 4; FIGS. 2 and 3; *see also* col. 13, ll. 14-16; FIGS. 1 and 7-9). The carriage disclosed by Bauck et al. is comparable to a carriage arm or actuator arm. The base portion (or base plate) 22 has two legs 52 and 54 with channels 64 and 66, respectively. (Bauck et al., col. 7, ll. 4-9 and 32-34; FIG. 2). The guard portion 24 has rectangular portions 112 and 114 that are attached to the channels 64 and 66 of the legs 52 and 54 of the base portion (or base plate) 22 using screws 28, 30, 32 and 34, or, alternatively, the guard portion 24 is formed as a single unitary structure with the base portion 22.² (Bauck et al., col. 6, ll. 46-48; col. 7, ll. 34-43; col. 9, ll. 61-64; col. 10, ll. 25-33;

¹Page 2 of the Office Action states that claim 2 was rejected, but claim 2 had previously been canceled. It is believed this is a typographical error in the Office Action.

²The guard portion 24 defines a leading edge 122, trailing edge 124 and a front edge 126. (Bauck et al., col. 10, ll. 61-67; FIG. 2).

FIGS. 2 and 3). The guard portion 24 "surrounds or enshrouds" the tip portion 26, and the claims describe the guard member (the "third member") as "being substantially in the same plane" as the base portion 22 (the "first elongated relatively flat support means") and the tip portion 26 (the "second elongated relatively flat support means"). (Bauck et al., col. 9, ll. 66-68; col. 10, ll. 43-46; col. 14, ll. 7-27; FIGS. 2 and 3). The tip portion (or load beam) 26 is a cross-shaped structure that is hingedly connected to the legs 52 and 54 of the base portion (or base plate) 22 via flexure means 36 and 38, which include leaf springs 100 and screws 102, 104, 106 and 108. (Bauck et al., col. 6, ll. 46-52; col. 8, ll. 3-7; col. 9, ll. 6-35; FIGS. 2, 3 and 6). A magnetic transducer 58 is supported by the tip portion 26. (Bauck et al., col. 8, ll. 18-21; FIG. 2). A projection 88 of the tip portion 26 engages a hole 131 in the guard portion 24, such that the tip portion 26 remains fixed within the guard portion 24 at an end that is opposite the base portion 22. (Bauck et al., col. 8, ll. 27-37; col. 11, ll. 61-65; FIGS. 2 and 4). In that way, the tip portion 26 is not completely cantilevered with respect to the guard portion 24, but rather the entire assembly 20 is cantilevered with respect to a carriage on which it is fixed.

Bauck et al. fails to show, teach or disclose an endcap having a body connected to an actuator arm as recited by independent claim 1. The base portion 22 disclosed by Bauck et al. is not an endcap. The term "endcap" is known in the art to refer to structures mechanically connected to the ends of actuator arms at or near the location where load beams/suspensions/flexures are connected, in order to provide balancing. (Specification, p. 2, ln 21 to p. 3, ln. 9; p. 11, ln 23 to p. 12, ln. 19). In contrast, a "baseplate" is known in art to be distinguishable from an endcap. Baseplates are used to connect load beams to actuator arms, with one or more baseplates often connected to a top side, bottom side, or top and bottom sides of the load beam. (Specification, p. 1, ll. 18-25). The base portion 22 of the assembly 20 of Bauck et al. is comparable to a baseplate, but is distinguishable from an endcap because the load beam (i.e., tip portion 26) extends from base portion 22, which is a characteristic of a baseplate rather than an endcap. The language of independent claim 1 recites that the claimed invention must be an endcap having a base portion connected to an actuator arm, and Bauck et al. fails to disclose that limitation,

which is not merely an intended use limitation but a positive structural limitation. Thus, the rejection of independent claim 1 should be withdrawn. Notification to that effect is requested.

It should further be noted that the characterizations of the Bauck et al. reference contained in the Office Action are not clear. For example, at page 3 of the Office Action it is stated that "the endcap is connected to the actuator arm at the body (figure 2, item 20 connects to item 22 via items 112 & 114)." However, Bauck et al. refers to the assembly 20 as a general descriptor for a collection of structures that includes the base portion 22, meaning that as Bauck et al. uses reference numbers 20 and 22 those elements cannot be connected together. (Bauck et al., col. 6, ll. 43-46). Moreover, Bauck et al. identifies elements 112 and 114 as rectangular end portions of the guard 24, and none of elements 20, 22, 112 and 114 cited in the Office Action is called an actuator arm in the text of Bauck et al. In view of these statement in the Office Action, it is unclear which elements of Bauck et al. are being cited as disclosing an actuator arm or endcap. Should the Bauck et al. reference be relied upon in further Office communications, clarification is requested.

Claims 3-8 depend from independent claim 1 and include all of the limitations of that base claim. Therefore, dependent claims 3-8 are likewise allowable over the cited art for the reasons given above with respect to independent claim 1, and the rejections of those claims under §102(b) should be withdrawn. Notification to that effect is requested.

Furthermore, dependent claims 3-8 recite limitations not shown, taught or disclosed by Bauck et al. For example, dependent claim 8 recites that the shielding feature is structured to divert an airflow proximate to a critical portion of a flexible interconnect circuit that is part of the head gimbal assembly. The Office Action cites FIG. 7 and col. 3, lines 48-59 of Bauck et al. as disclosing a shielding feature positioned relative to a flexible interconnect circuit. However, the cited figure and passage of Bauck et al. do not refer to a flexible interconnect circuit that is part of a head gimbal assembly. Though Bauck et al. does disclose electrical circuits, that disclosure is not specific to a flexible interconnect circuit that is part of a head gimbal assembly as recited by dependent claim 8. For that reason, the cited figure of Bauck et al. does not show a shielding feature positioned relative to a flexible interconnect circuit.

New dependent claim 21, which depends from independent claim 1, recites that a portion of the head gimbal assembly defines a first plane and the shielding feature of the endcap defines a second plane that is arranged substantially parallel to and spaced from the first plane. The sharp, slanted edge 120 of the guard of Bauck et al. lies in the same plane as the rectangular portions 112 and 114, because Bauck et al. is explicit that the guard 24 lies in a single plane. (Bauck et al., col. 9, ll. 66-68; col. 10, ll. 43-46; col. 14, ll. 7-27; FIGS. 2 and 3). Thus, Bauck et al. does not disclose the limitations of new dependent claim 21.

Independent claim 11 requires an actuator arm, a head gimbal assembly connected to a first side of the actuator arm, and a shield having a first portion attached to the actuator arm and a second cantilevered portion that extends relative to an edge portion of the head gimbal assembly for reducing airflow excitation of the head gimbal assembly. According to independent claim 11, the shield is attached to a second side of the actuator arm that is opposite the first side of the actuator arm such that the shield extends adjacent to the head gimbal assembly and the second cantilevered portion is spaced from the head gimbal assembly.

Bauck et al. fails to show, teach or disclose a head gimbal assembly attached to a first side of an actuator arm and a shield attached to a second side of the actuator arm that is opposite the first side of the actuator arm as recited by independent claim 11. The Office Action at page 5 describes Bauck et al. by stating that "the shield is attached to a second side of the actuator arm that is opposite the first side of the actuator arm (figure 3, item 112 is at opposite end from item 106 & 108)." However, independent claim 11 recites that the a shield and a head gimbal assembly are at opposite *sides* of an actuator arm, rather than at opposite *ends* thereof. Moreover, the figures of Bauck et al. cited in the Office Action do not show an actuator arm. As noted above, the base portion (or base plate) 22 of Bauck et al. has holes 46, 48 and 50 for screw attachment to a carriage that is not shown in FIGS. 2 and 3. (Bauck et al., col. 6, ln. 63 to col. 7, ln. 4; FIGS. 2 and 3). Rather, the carriage 152 or support means 14 disclosed by Bauck et al. would be comparable to an actuator arm, and Bauck et al. only discloses structures attached to one side of the carriage 152 and support means 14. (Bauck et al., col. 13, ll. 14-16; FIGS. 1 and 7-9). The purpose

of the guard 24 of Bauck et al. is not to reduce windage excitation but to help create an opening 156 between flexible magnetic discs in a file 134 and to help eject the assembly 20 from the file 134 in failure situations. (Bauck et al., col. 11, ll. 5-23; FIG. 7). For those reasons, Bauck et al. fails to disclose a shield attached to an opposite side of an actuator arm from a head gimbal assembly, but instead discloses guard 24 and tip portion 26 both connected to a common base portion 22 for connection to the same side of an actuator or carriage arm 152/14. Thus, the rejection of independent claim 11 under §102(b) should be withdrawn, and notification to that effect is requested.

Claims 12, 13 and 15-18 depend from independent claim 11 and include all of the limitations of that base claim. Therefore, dependent claims 12, 13 and 15-18 are likewise allowable over the cited art for the reasons given above with respect to independent claim 11. The rejections of dependent claims 12, 13 and 15-18 under §102(b) should be withdrawn, and notification to that effect is requested.

Furthermore, dependent claims 12, 13 and 15-18 recite limitations not shown, taught or disclosed by Bauck et al. For example, amended dependent claim 13 recites that the shield is an endcap. As discussed above, the term "endcap" is known in the art to refer to structures mechanically connected to the ends of actuator arms at or near the location where load beams/suspensions/flexures are connected, in order to provide balancing. (Specification, p. 2, ln 21 to p. 3, ln. 9; p. 11, ln 23 to p. 12, ln. 19; *cf.* Specification, p. 1, ll. 18-25). Bauck et al. may disclose a baseplate, but does not disclose an endcap. The Office Action identifies rectangular portions 112 and 114 of the guard 24 as "endcaps of the shield". However, as clarified by the present amendment, amended dependent claim 13 recites that the shield is configured to constitute an endcap, as opposed to reciting that the endcap is an additional structure separate from the shield.

Furthermore, Bauck et al. fails to show, teach or disclose each and every limitation of amended dependent claim 15, which recites that the shield is an endcap having a body and a plurality of protrusions from that body. As noted above, Bauck et al. does not disclose an endcap. Moreover, Bauck et al. does not disclose an endcap having a plurality of protrusions. The Office

Action states that in FIG. 2 of Bauck et al., "items 24 on right and left" constitute a plurality of protrusions. However, the guard 24 of Bauck et al. is a single structure and can only be considered a single protrusion.

With respect to dependent claim 18, which recites that at least one of the plurality of protrusions has a first portion that defines a plane and a distal portion that defines another plane. Bauck et al. does not disclose first and second portions of an endcap that define different planes. As noted above, Bauck et al. does not disclose an endcap. Moreover, the sharp, slanted edge 120 of the guard of Bauck et al. lies in the same plane as the rectangular portions 112 and 114, because Bauck et al. is explicit that the guard 24 lies in a single plane. (Bauck et al., col. 9, ll. 66-68; col. 10, ll. 43-46; col. 14, ll. 7-27; FIGS. 2 and 3).

Claim Rejections - 35 U.S.C. §103(a)

Claims 9, 10, 14, 19 and 20 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833).

Nagahiro et al. discloses a carriage arm assembly (or actuator arm assembly) for a magnetic disc drive. Nagahiro et al. discloses a suspension 2 (or load beam) that supports a slider 3 and a magnetic head (not shown) at a "tip" or distal end of a rotatable carriage arm 7, and a restraint board 12 affixed to the carriage arm 7. (Nagahiro et al., ¶¶16, 35 and 36; FIGS. 1-3). The restraint board 12 is a thin T-shaped structure in the embodiment shown in FIGS 1-3 of Nagahiro et al. (Nagahiro et al., ¶36; FIGS. 1-3). Opposing arms of the restraint board 12 are affixed to arm center portions 10a and 10B with viscoelastic materials 11 and a "residual end" of the restraint board 12 is affixed to an arm root portion 13 parallel to a disc 6. (Nagahiro et al., ¶¶16 and 36; FIGS. 1-3). In other words, the restraint board 12 is resiliently secured at a middle portion of the arm 7 such that the restraint board 12 has no free or cantilevered protrusions and is spaced from the suspension 2. A vibration damping effect is thereby produced as the viscoelastic material 11 converts shearing strain energy to heat, which is then dissipated. (Nagahiro et al., ¶37). This damping effect is dependent upon the restraint board 12 being completely fixed to the arm 7 in

order to produce strain in the viscoelastic material 11. Nagahiro et al does not specifically disclose the position of the suspension 2 relative to the top and bottom faces of the arm 7, though in FIG. 2 the suspension 2 appears to extend from a middle portion of the arm 7 in between the top and bottom faces of the arm 7.

In further embodiments, Nagahiro discloses affixing a restraint-board-like damper body 15 of a different shape inside a hole 17 in each arm 7 of an assembly formed by a number of carriage arms 7. (Nagahiro et al., ¶¶40 and 47; FIGS. 3-6). None of the embodiments of Nagahiro et al. disclose reducing or preventing vibration by diverting airflow, but rather damping or dissipating vibrations that have developed in the disc drive. (See Nagahiro et al., ¶¶7, 13 and 17). Indeed, the function of the damping mechanism of Nagahiro et al. requires bending of the actuator arm due to vibration in order to provide a damping effect. (Nagahiro et al., ¶¶7, 13 and 17).

Claims 9 and 10 depends from independent claim 1 and include all of the limitations of that base claim, and claim 14 depends from independent claim 11 and includes all of the limitations of that base claim. Therefore, for the reasons given above, dependent claims 9, 10 and 14 are likewise allowable over the cited references. Furthermore, Nagahiro does not disclose controlling airflow as recited by dependent claims 9 and 10. Rather, Nagahiro is directed an mechanically damping or dissipating vibration in a disc drive. (See Nagahiro et al., ¶¶7, 13 and 17). Most importantly, with respect to all of dependent claims 9, 10 and 14, the damping effect provided by Nagahiro is dependent upon its restraint board 12 being completely fixed to the arm 7 (i.e., not being cantilevered) in order to produce strain in the viscoelastic material 11. Thus, combining the teachings of the cited references would undermine the recitations of base claims 1 and 11 regarding a cantilevered configuration. Moreover, a person of ordinary skill in the art would not have known how to combine the teachings of Bauck et al., which are directed to guards for protecting an actuator assembly inserted into a flexible disc file, with the teachings of Nagahiro et al., which are directed to damping or dissipating vibrations in a disc drive assembly. The cited references deal with different, unrelated problems.

Amended independent claim 19 relates to a shielded head actuation system and requires a rotatable actuator arm, a head gimbal assembly attached to a first side of the actuator arm, a rotatable magnetic disc, and an endcap that includes a body and a symmetrically balanced shape feature. Amended independent claim 19 requires that the body be attached to a second side of the actuator arm opposite the head gimbal assembly such that the shape feature is positioned adjacent to a top face of the head gimbal assembly in a cantilevered configuration to reduce airflow excitation of the head gimbal assembly. According to amended independent claim 19, the top face of the head gimbal assembly is defined opposite the rotatable magnetic disc.

Bauck et al. in view of Nagahiro fails to disclose, teach or suggest each and every limitation of amended independent claim 19. For instance, as discussed above, the term "endcap" is known in the art to refer to structures mechanically connected to the ends of actuator arms at or near the location where load beams/suspensions/flexures are connected, in order to provide balancing. (Specification, p. 2, ln 21 to p. 3, ln. 9; p. 11, ln 23 to p. 12, ln. 19; cf. specification, p. 1, ll. 18-25). Bauck et al. may disclose a baseplate, but does not disclose an endcap. Moreover, as also noted above, Bauck et al. only discloses structures attached to one side of the carriage 152 and support means 14, and fails to disclose an endcap attached to an opposite side of an actuator arm from a head gimbal assembly. (Bauck et al., col. 13, ll. 14-16; FIGS. 1 and 7-9). Further, the amended language of independent claim 19 also further clarifies that the endcap has a shape feature positioned adjacent to a top side of the head gimbal assembly, while the guard 24 of Bauck et al. is positioned adjacent to side edges rather than a top side of head gimbal assembly. Nagahiro et al. cannot supply any of these missing limitations.

In addition, a person of ordinary skill in the art would not have known how to combine the teachings of Bauck et al., which are directed to guards for protecting an actuator assembly inserted into a flexible disc file, with the teachings of Nagahiro et al., which are directed to damping or dissipating vibrations in a disc drive assembly. The cited references deal with different, unrelated problems. The references are not compatible or modifiable in a way that would produce the present invention as claimed in amended independent claim 19. The damping effect

provided by Nagahiro is dependent upon its restraint board 12 being completely fixed to the arm 7 (i.e., not being cantilevered) in order to produce strain in the viscoelastic material 11. Thus, combining the teachings of the cited references would undermine the recitations of base claims 1 and 11 regarding a cantilevered configuration.

Thus, the rejection of amended independent claim 19 under §103(a) should be withdrawn. Notification to that effect is requested.

Claim 20 depends from amended independent claim 19 and includes all of the limitations of that base claim. Dependent claim 20 is likewise allowable over the cited art for the reasons given above with respect to amended independent claim 19. Notification to that effect is requested.

CONCLUSION

All of the pending claims are in condition for allowance. The examiner is invited to contact the undersigned at the phone number below if it would in any way facilitate consideration of the present application. The Commissioner is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 11-0982.

Respectfully submitted,

KINNEY & LANGE, P.A.

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By:



Austen Zuege, Reg. No. 57,907
THE KINNEY & LANGE BUILDING
312 South Third Street
Minneapolis, MN 55415-1002
Telephone: (612) 339-1863
Fax: (612) 339-6580

AZ:kmm